

From the INTERNATIONAL BUREAU

**PCT**NOTIFICATION CONCERNING  
TRANSMITTAL OF COPY OF INTERNATIONAL  
PRELIMINARY REPORT ON PATENTABILITY  
(CHAPTER I OF THE PATENT COOPERATION  
TREATY)

(PCT Rule 44bis.I(c))

To:

HENNEMAN, Jr., Larry, E.  
Henneman & Associates, PLC  
714 W. Michigan Avenue  
Three Rivers, MI 49093  
ETATS-UNIS D'AMERIQUEDate of mailing (*day/month/year*)  
18 December 2008 (18.12.2008)Applicant's or agent's file reference  
0025-027PCT**IMPORTANT NOTICE**International application No.  
PCT/US2007/013014International filing date (*day/month/year*)  
31 May 2007 (31.05.2007)Priority date (*day/month/year*)  
31 May 2006 (31.05.2006)

Applicant

FLEXTRONICS AP LLC et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 0025-027PCT	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/US2007/013014	International filing date ( <i>day/month/year</i> ) 31 May 2007 (31.05.2007)	Priority date ( <i>day/month/year</i> ) 31 May 2006 (31.05.2006)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant FLEXTRONICS AP LLC			

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).		
2.	This REPORT consists of a total of 6 sheets, including this cover sheet.		
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.			
3.	This report contains indications relating to the following items:		
<input checked="" type="checkbox"/>	Box No. I	Basis of the report	
<input type="checkbox"/>	Box No. II	Priority	
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	
<input type="checkbox"/>	Box No. IV	Lack of unity of invention	
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	
<input type="checkbox"/>	Box No. VI	Certain documents cited	
<input type="checkbox"/>	Box No. VII	Certain defects in the international application	
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application	
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	Date of issuance of this report 03 December 2008 (03.12.2008)  Authorized officer  <div style="text-align: center; font-weight: bold;">Ellen Moyse</div>  e-mail: pt02.pct@wipo.int
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## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

LARRY E. HENNEMAN, JR.  
HENNEMAN & ASSOCIATES, PLC  
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**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

**27 AUG 2008**

Applicant's or agent's file reference  
0025-027PCT

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.  
PCT/US2007/013014

International filing date (day/month/year)  
31 May 2007

Priority date (day/month/year)  
31 May 2006

International Patent Classification (IPC) or both national classification and IPC  
IPC(8) - H01J 5/02 (2008.04)  
USPC - 250/239

Applicant

FLEXTRONICS AP LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Date of completion of this opinion

13 August 2008

Authorized officer:

Blaine Copenheaver

PCT Helpdesk: 571-272-4300  
PCT OSP: 571-272-7774

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITYInternational application No.  
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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:



the international application in the language in which it was filed.



a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:

a. type of material



a sequence listing



table(s) related to the sequence listing

b. format of material



on paper



in electronic form

c. time of filing/furnishing



contained in the international application as filed



filed together with the international application in electronic form



furnished subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement			
<b>1. Statement</b>				
Novelty (N)	Claims	2-5,9,12,13	YES	
	Claims	1,6-8,10,11,14	NO	
Inventive step (IS)	Claims	None	YES	
	Claims	1-14	NO	
Industrial applicability (IA)	Claims	1-14	YES	
	Claims	None	NO	
<b>2. Citations and explanations:</b>				
<p>Claims 1, 6-8, 10, and 11 lack novelty under PCT Article 33(2) as being anticipated by Nagano.</p> <p>Regarding claim 1, Nagano discloses a digital camera module (P. 9, lines 30) comprising: a circuit substrate (FIG. 3, (13) "insulating sheet", P. 3 [0050]); a housing mounted on said circuit substrate (FIG. 3, wherein the "holding module" (5) is bonded to the "insulating sheet" (13), P. 2 [0047], P. 3 [0050]); an image capture device coupled to said circuit substrate (FIG. 3, wherein the "imaging sensor chip" (16) is connected to the "insulating sheet", P. 3 [0050, 0051]; and wherein said housing allows said image capture device to be mounted to said circuit substrate after said housing is mounted on said circuit substrate (FIG. 7, shown below, wherein the "holding module" (5) is mounted onto the "insulating sheet" (13) before the "imaging sensor chip" (16), P. 4 [0062-0069]).</p> <p>Regarding claim 6, Nagano further discloses the digital camera module according to claim 1, wherein said housing is coupled to said circuit substrate after said housing is formed (FIG. 7, wherein the "holding module" (5) is bonded to the "insulating sheet" (13) with the "adhesive agent" (15), P. 4 [0062-0069]).</p> <p>Regarding claim 7, Nagano further discloses the digital camera module according to claim 1, wherein said housing is capable of withstanding an attachment process used to mount said image capture device onto said circuit substrate (FIG. 7, wherein the "holding module" (5) is capable of withstanding the attachment process, e.g. increased temperature and pressure, used to bond the "imaging sensor chip" (16) to the "insulating sheet" (13), P. 4 [0062-0069]).</p> <p>Regarding claim 8, Nagano discloses a method for manufacturing a camera module comprising: providing an image capture device (FIG. 3, wherein the "imaging sensor chip" (16) is connected to the "insulating sheet", P. 3 [0050,0051]); providing a circuit substrate (FIG. 3 (13) "insulating sheet", P. 3 [0050]); mounting a housing onto said circuit substrate (FIG. 3, wherein the "holding module" (5) is bonded to the "insulating sheet" (13), P. 2 [0047], P. 3 [0050]); and mounting said image capture device onto said circuit substrate after said housing is mounted on said circuit substrate (FIG. 7, wherein the "holding module" (5) is mounted onto the "insulating sheet" (13) before the "imaging sensor chip" (16), P. 4 [0062-0069]).</p> <p>Regarding claim 10, Nagano further discloses the method for manufacturing a camera module according to claim 8, wherein: said step of mounting said housing onto said circuit substrate includes mounting said housing on a first surface of said circuit substrate (FIGS. 3,7, wherein the "holding module" (5) is bonded to the top surface of the "insulating sheet" (13), P. 3 [0050], P. 4 [0062-0069]); and said step of mounting said image capture device onto said circuit substrate includes mounting said image capture device on a second surface of said circuit substrate opposite said first surface of said circuit substrate (FIGS. 3,7, wherein the "imaging sensor chip" (16) is bonded to the bottom surface of the "insulating sheet" (13), P. 3 [0050], P. 4 [0062-0069]).</p> <p>Regarding claim 11, Nagano further discloses the method for manufacturing a camera module according to claim 8, said step of mounting said housing onto said circuit substrate includes mounting a preformed housing onto said circuit substrate (FIG. 7, wherein the "holding module" (5) is bonded to the "insulating sheet" (13) with the "adhesive agent" (15), P. 4 [0062-0069]).</p> <p>Claim 14 lacks novelty under PCT Article 33(2) as being anticipated by Webster et al., hereinafter referred to as Webster.</p> <p>Regarding claim 14, Webster discloses a method for manufacturing camera modules comprising: providing a plurality of image capture devices (FIG. 8 (108) "image sensors", col. 12 lines 43-49); providing a circuit substrate having a plurality of individual camera module circuit boards embodied therein (FIG. 8, wherein a plurality of individual "substrates" 102 each having an individual "base" (104) are integrally connected together forming a circuit substrate, col. 11 lines 37-50); providing a plurality of housings (wherein a housing is shown in FIG. A, modified version of FIG. 8, below, col. 11 line 37 to col. 12 line 57; a housing is also shown as the pair of "sidewalls" (106) in FIG. 2, col. 3 line 32 to col. 4 line 30); mounting a respective one of said housings onto each of said individual camera module circuit boards (FIGS. 2,8, wherein the "sidewalls" (106) are integrally formed onto each of the "bases" (104), col. 3 line 32 to col. 4 line 30, col. 11 line 37 to col. 12 line 57); and mounting a respective one of said image capture devices onto each of said individual camera module circuit boards (FIG. 8, wherein one "image sensor" (108) is attached to each of the "bases" (104), col. 12 lines 43-49), each of said image capture devices being mounted on an associated one of said camera module circuit boards after one of said housings is mounted on said associated camera module circuit board (FIGS. 2,8, wherein the "sidewalls" (106) and the "base" (104) are integrally formed in a single piece, thus, the "sidewalls" (106) are mounted on the "base" (104) before the "image sensor" before the "image sensor" (108), col. 4, lines 11-30, col. 11, line 37 to col. 12, line 57).</p>				

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
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**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Claims 2, 4, 5, 9, and 12 lack an inventive step under PCT Article 33(3) as being obvious over Nagano in view of Webster.

Regarding claim 2, Nagano discloses the digital camera module according to claim 1. Nagano does not specifically disclose that housing is molded onto said circuit substrate.

Webster teaches an optical module, wherein a housing is molded onto a circuit substrate (FIG. 2, wherein the "sidewalls" (106) and the "base" (104) are pre-molded and are integrally formed into a single piece, col. 4 lines 11-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the molding feature of Webster's with the module taught by Nagano for the purpose of simplifying the fabrication process.

Regarding claim 4, Nagano and Webster disclose and teach of the digital camera module according to claim 2, wherein Nagano further discloses that said housing is coupled to a surface of said circuit substrate and said image capture device is coupled to an opposite surface of said circuit substrate (FIGS. 3, 7, wherein the "holding module" (5) is bonded to the top surface of the "insulating sheet" (13), and the "imaging sensor chip" (16) is bonded to the bottom surface of the "insulating sheet" (13) P. 3 [0050], P. 4 [0062-0069]).

Regarding claim 5, Nagano and Webster disclose and teach of the digital camera module according to claim 4, wherein Nagano further discloses that said circuit substrate defines an aperture (FIGS. 3, 6A, 6B, 7, wherein the "insulating sheet" (13) defines an "opening" (21), P. 4 [0059, 0065]); and said image capture device is mounted so that light passing through said aperture impinges on a light sensitive portion of said image capture device (FIGS. 3, 6A, 6B, 7, wherein the "imaging sensor chip" (16) is mounted so that light passing through the "opening" (21) impinges on the "light-receiving area" (17), P. 4 [0059, 0065]).

Regarding claim 9, Nagano discloses the method for manufacturing a camera module according to claim 8. Nagano does not specifically disclose that said step of mounting said housing onto said circuit substrate includes molding said housing onto said circuit substrate. Webster teaches an optical module, wherein a step of mounting a housing onto a circuit substrate includes molding said housing onto said circuit substrate (FIG. 2, wherein the "sidewalls" (106) and the "base" (104) are pre-molded and are integrally formed into a single piece, col. 4 lines. 11-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the molding feature of Webster's with the method taught by Nagano for the purpose of simplifying the fabrication process.

Regarding claim 12, Nagano discloses the method for manufacturing a camera module according to claim 8. Nagano does not disclose said step of mounting said image capture device onto said circuit substrate includes mounting said image capture device through an opening in said housing.

Webster teaches an optical module, wherein a step of mounting an image capture device onto a circuit substrate includes mounting said image capture device through an opening in a housing (FIGS. 2, 8, wherein the "sidewalls" (106) and the "base" (104) are integrally formed into a single piece, thus, the "sidewalls" (106) are mounted on the "base" (104) before the "image sensor" (108), and the "image sensor" (108) is mounted to the "base" (104) through the opening defined by the "sidewalls" (106), col. 4 lines. 11-30, col. 11 line 37 to col. 12 line 57).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the molding feature of Webster's with the method taught by Nagano to insert the image capture device through the opening of the housing for the purpose of simplifying the fabrication process and protecting the image capture device from ambient environment such as dust.

Claims 3 and 13 lack an inventive step under PCT Article 33(3) as being obvious over Nagano in view of Webster in view of Bittner et al. hereinafter referred to as Bittner.

Regarding claim 3, Nagano and Webster disclose and teach of the digital camera module according to claim 2, wherein Webster further discloses that said housing defines a cavity having a dimension greater than the dimension of said image capture device to accommodate said image capture device with a diagonal (shown in FIG. 2, col. 3 line. 32 to col. 4 line. 30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the dimensions of Webster's housing and image capture device with the module taught by Nagano to insert the image capture device through the opening of the housing for the purpose of simplifying the fabrication process and protecting the image capture device from ambient environment such as dust. Nagano and Webster do not disclose that said housing defines a bore with a diameter larger than a diagonal of said image capture device. Bittner teaches an image capture device that includes a retainer with two bores therethrough. Each bore (Bittner: fig. 6; [94a and 94b]) is proximal to and aligned with an engaging pin (Bittner: fig. 6 [92a, 92b]) and is sized to receive a guide pin (Bittner: paragraph 50; fig. 3, [65]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine housing defined bore of Bittner with the module taught by Nagano and Webster for the purpose of reducing material and cost by making the housing cylindrical, instead of rectangular, to complement the cylindrical lens barrel with minimum material yet big enough to accommodate the image capture device. Further though Bittner does not explicitly disclose the size of the bore in relation to the diagonal of the image capture device it would have been obvious to one of ordinary skill in the art at the time of the invention to create bore larger than the diagonal of the image capture device since such a modification would involve a mere change in size and a change in size is generally recognized as being within the level of ordinary skill in the art.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITYInternational application No.  
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## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Regarding claim 13, Nagano and Webster disclose and teach of the method for manufacturing a camera module according to claim 12, wherein Webster further discloses that said step of mounting said image capture device onto said circuit substrate includes mounting said image capture device through a cavity in said housing adapted to receive a lens unit (FIG. 2, wherein the "image sensor" (108) is mounted through a cavity defined by the "sidewalls" (106) adapted to receive the "lens housing" (130), col. 3 line 32 to col. 4 line 30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the dimensions of Webster's housing and image capture device with the module taught by Nagano to insert the image capture device through the opening of the housing for the purpose of simplifying the fabrication process and protecting the image capture device from ambient environment such as dust. Nagano and Webster do not specifically disclose that the housing defines a bore.

Bittner teaches an image capture device that includes a retainer with two bores therethrough. Each bore (Bittner: fig. 6; [94a and 94b]) is proximal to and aligned with an engaging pin (Bittner: fig. 6 [92a, 92b]) and is sized to receive a guide pin (Bittner: paragraph 50; fig. 3, [65]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine housing defined bore of Bittner with the module taught by Nagano and Webster for the purpose of reducing material and cost by making the housing cylindrical, instead of rectangular, to complement the cylindrical lens barrel with minimum material yet big enough to accommodate the image capture device.

Claims 1-14 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.